erected; and the ſtaves being ready, all of one dimenſion, and the ſcrew-pins all of a ſize, the arch might be ſprung in a few days, breaking joint, as in Fig. VII. Thus each flange and rib would butt upon its neighbour, and the ſcrew-pins confining the whole, it would become like one ſolid ſegment of a cylinder one foot thick, *extending into the piers.*

By this mode, the difficulties which ariſe in fitting diagonal, perpendicular and lateral braces, are avoided, the top plate performing the office of all ſuch braces; which top-plates, in other compoſitions, have no tendency to ſtrengthen: thus every particle is applied to reſiſtance, and the materials have but few joinings; which junctions have alſo broad and permanent bearings of one foot on each other, the flange and ribs being caſt of that depth. Thus, I conceive, a bridge of one hundred feet, or perhaps one hundred and fifty feet ſpan, might be erected at a cheap rate, with with a ſmall quantity of materials, yet with the proſpect of great durability. If I ſuppoſe a bridge one hundred feet ſpan, thirty wide, with the top plate one inch thick, five flanges or ribs, each one foot broad and two inches thick, the whole weight of the arch would not be more than ſeventy-eight tons, allowing one pound to every four cube inches of caſt-iron.

So far relates to iron bridges of one hundred or one hundred and fifty feet ſpan; but ſhould it be neceſſary to extend them to a greater length, to ſay three hundred feet, two ſegments would then be requiſite; the firſt, as in Fig. VI. as the principal ſupport; the ſecond, to eaſe the paſſage, ſhould be of ſuch a bend as would admit an eaſy aſcent and deſcent; and, by being part of a curve, it alſo tends to ſtrengthen; thus, if I ſay, ſpan three hundred feet, the firſt ſpring thirty, the ſecond ſpring only ten feet, they both muſt

be

be compreſſed into ſtreight lines, before they can come down; they will alſo have twenty perpendicular feet of bearing on the butment, the bearings oppoſite to the two ſegments being oppoſed by ſegments entering the butments, as before deſcribed; the two ſegments muſt be kept aſunder by perpendiculars in the haunches, placed at about ten feet diſtance from each other, as in the Figure. See Plate XV. exhibiting the combination by ribs and braces; alſo Plate XVI. repreſenting the arch of ſtaves.

Having exhibited the mode of conſtruction, I conceive it unneceſſary to comment on the particular formation, or to draw a comparative view of this and other bridges of iron; as in caſes where they may be required; the artiſt will weigh the various circumſtances, inveſtigate the ſeveral modes of building, and chooſe for himſelf; in which there is a leading deliberation, viz. By what means can a given quantity of materials be arranged, ſo as to incur the leaſt expence in erecting, and be rendered moſt permanent; and by which mode will the leaſt materials anſwer the purpoſe?

(very good)

CHAP.